

Cumulative Subject Index¹

Volumes 32-35

A

- Acetic acid
 esterification with *n*-propanol over silica gel, **35**, 44
- Acetone
 adsorption
 on dispersed cupric oxides, **34**, 329
 on MgO and NiO, infrared spectra, **32**, 155
- Acetylene
 cyclotrimerization over NiY zeolites, **32**, 190
 hydrogenation over palladium-gold alloys, **35**, 407
- Acidity
 Y zeolite Al site reactivity, **33**, 497
- Acid sites
 generation, mechanism, **35**, 225
- Acrolein
 and ammonia adsorption over bismuth molybdate, **33**, 420
- Acrylonitrile
 yield from propylene ammoxidation over bismuth molybdates, **34**, 50
- Activation energy
 oxygen desorption from silver, **33**, 163
- Active sites
 cracking, zeolites, **34**, 327
 olefin polymerization over supported chromium oxide, **35**, 335
 on amorphous alumina: selective poisoning, **33**, 123
- Adsorbed species
 water adsorption on boron phosphate, **34**, 376
- Adsorption
 acetone on MgO and NiO, infrared spectra, **32**, 155
 acrolein and ammonia equilibria over bismuth molybdate, **33**, 420
 amino acids on Ni/SiO₂, **33**, 176
 and catalysis, concomitant, **33**, 74
 carbon monoxide, nitrogen, ethylene, nitric oxide, and ammonia in AgX and AgY zeolites, **32**, 482
 carbon monoxide on Ni-Al, **35**, 417
 carbon monoxide on ruthenium-silica, **32**, 254
 carbon monoxide
 on supported palladium or palladium-silver alloys, **32**, 315
 on thoria, **35**, 184
 carbon tetrachloride on uranium dioxide, **32**, 272
 competitive: Monte Carlo modeling of (γ -alumina), **32**, 99
 competitive kinetics on platinum (gases), **32**, 50
 dissociative, Langmuir-Hinshelwood model:
 crystallite size effects in ammonia oxidation, **33**, 457
 ethylene on supported rhenium oxides, **34**, 494
 fouled and unfouled catalysts, **32**, 37
 heats: water on alumina, **35**, 1
 hydrogen by nickel films, isotherm, **34**, 454
 mixed: hydrogen and carbon monoxide on cobalt, **32**, 325
 nitrogen on Ru-C-K, **35**, 61
 olefins and ammonia on UO₂-Sb₂O₃, **35**, 452
 oxygen on chromia-alumina solid solutions, **33**, 299
 porous catalyst impregnation, kinetics, **35**, 206
 reaction conditions: *t*-butyl alcohol and water on alumina, **32**, 396
 sites: energy distribution, γ -alumina, **35**, 1
 toluene on alumina-chroma, **35**, 472
 trichloroethylene on uranium dioxide, **35**, 153
 types on fouled and unfouled catalyst, **32**, 37
- Aerosil
 burning catalyst, **35**, 383
- Agglomeration
 burning catalysts, **35**, 383
- Aging
 rate determining step: supported metals, **35**, 115
- Alcohol
 butyl: over matrix-bound sulfonic acid groups, product distributions, **34**, 275
 dehydration: pulse reaction technique, **33**, 365
 isopropyl: oxidation to acetone on cupric oxides, **34**, 329
 propyl: over matrix-bound sulfonic acid groups, product distributions, **34**, 275
 β -phenyl-ethyl: dehydrogenation and dehydration kinetics, **33**, 327
 primary-secondary (binary mixture), over reduced nickel oxide-Cab-O-Sil, **34**, 338
 secondary, dehydration on alumina, **33**, 142
- Alkali metal
 adsorbed on active carbon: H₂-D₂ exchange, **35**, 320

¹ Boldface numbers indicate appropriate volume; lightface numbers indicate pagination.

- Alkali-molybdates
Na and K, reoxidation in catalytic process, **33, 1**
- Alkaline earth metal oxide
elimination reaction catalyst, **33, 474**
- Alkanes
reactions on iridium-gold films, **35, 330**
- Alkylation
benzene propylation, sulfonic acid resin catalyst, **34, 288**
- Alkylbenzenes
autoxidation in acetic acid over cobalt bromide, **33, 480**
- Alloys
copper-gold, surface composition, **33, 202**
copper-nickel, and carbon formation from benzene, **33, 98**
formation, mechanism, **35, 232**
iridium-gold films, alkane reactions on, **35, 330**
nickel-aluminum, photoelectric work functions, **35, 417**
- Alloy
palladium-gold, hydrocarbon reactions on, **35, 407**
palladium-iron, alumina supported, **35, 232**
platinum-gold, surface composition, **33, 316**
platinum-tin, surface composition, **33, 202**
silica-supported nickel-copper, chemisorption, **34, 162**
silver-gold, surface composition, **34, 13**
silver-palladium
silica- and alumina-supported ethylene oxidation, **32, 492**
surface composition, **33, 202**
- Alumina
aerogel, hydrogen spillover from nickel-alumina, **33, 145**
alcohol dehydrogenation on: simulation, **32, 99**
alcohol dehydration on, **33, 142**
amorphous, catalytic activity, **33, 123**
t-butyl alcohol dehydration, adsorption studies at reaction conditions, **32, 396**
diffusion with fouled and unfouled surfaces, **32, 37**
elimination reaction catalyst, **33, 474**
fluorescence with high-area samples, reduction, **32, 343**
fluorided (α -AlF₃/Al₂O₃ and β -AlF₃/Al₂O₃) in 1-pentene double-bond isomerization, **33, 39**
iodine reduction on, **32, 20**
support for Co-Mo, **32, 63**
surface redox events, **32, 20**
structural changes, molybdenum-induced, **32, 63**
- γ -Alumina
surface models for dehydration catalysis, **32, 99**
- η -Alumina
surface dehydration and rehydration, **35, 1**
toluene adsorption, neutron, scattering, **35, 476**
- Alumina gel
pseudoboehmite water content structure, **33, 265**
- Alumina-silica
gel, tetramethylammonium offretite crystallization from, **33, 414**
- Alumina surfaces
electron transfer, **32, 20**
- Aluminum
site distinction and Y zeolite acid strength, **33, 497**
site reactivity in faujasite-type zeolites, **34, 327**
- Amine boranes
structure and activity in nickel electroless plating, **32, 429**
- Amino acids
Ni/SiO₂ adsorption, **33, 176**
- Ammonia
adsorption on UO₃-Sb₂O₃, **35, 452**
and acrolein adsorption over bismuth molybdate, **33, 420**
decomposition over noble metals, **35, 34**
decomposition over tungsten **33, 47**
from nitric oxide reduction by hydrocarbons over platinum-silica, **32, 470**
low-temperature oxidation over supported Pt, **33, 457**
oxidation
catalytic etching of platinum, **32, 114**
over lanthanum calcium manganites, **32, 415**
pretreatment: nickel oxide reduction by H₂, **35, 92**
- Ammonium perchlorate
catalyzed burning, **35, 383**
- Ammonium Y zeolite
deamination, **35, 476**
- Ammonoxidation
propylene over molybdate, tungstate and vanadate with point defects, **35, 401**
- Aniline
radical: oxidative coupling from, **35, 196**
- Antimony oxides
1-butene oxidation and isomerization, sites, **34, 68**
- Aqueous-phase oxidation
phenol over copper oxide, **35, 140**
- Argon
ion bombardment: effect on hydrogen adsorption by nickel films, **34, 454**
- Auger electron spectroscopy
methyl chloride reaction with silicon metal, lead surface poisoning of copper catalysts, **34, 356**
- Automobile exhaust
SO_x poisoning of metal oxide catalysts, **33, 249**

- Autoxidation
alkylbenzenes in acetic acid over cobalt bromide,
33, 480
- B**
- Barium oxide
benzaldehyde conversion, 35, 247
- Benzaldehyde
conversion over alkaline earth metal oxides, 35,
247
- Benzene
alkylation of 1-butene over calcined ammonium
type Y zeolite, 33, 256
carbon formation from decomposition over cop-
per-nickel alloys, 33, 98
propylation, sulfonic acid resin catalyst, 34, 288
- Benzothiophene
hydrogenolysis over $\text{CoO-MoO}_3\text{-Al}_2\text{O}_3$, 35, 353
- Benzyl benzoate
formation over alkaline earth metal oxides, 35,
247
- $\text{Bi}_2\text{O}_3\text{-SnO}_2$
olefin oxidative dehydrodimerization over, 34,
29
- Bismuth
molybdates (multicomponent), cationic effects
on activity of, 32, 25
- Bismuth molybdate
 $\text{Bi}_2\text{Mo}_2\text{O}_8$, stability and olefin adsorption prop-
erties, 32, 362
1-butene oxidation, 32, 25
koechlinite, acrolein and ammonia adsorption
equilibria over, 33, 420
olefin oxidation, electron exchange processes, 34,
462
preparation and characterization, for propylene
oxidation, 34, 79
propylene ammoxidation, 34, 50
silica support, redox, 34, 257
- Bismuth phosphomolybdates
 $\text{Bi}_2\text{PMo}_{12}\text{O}_{42}$, silica-supported, stability and olefin
adsorption properties, 32, 362
- Boehmite
and water structure in pseudoboehmite, 33, 265
- Bond migration
octadecenoates, in hydrogenation over nickel,
32, 337
- Boranes
amine borane structure, effect on activity in
electroless plating, 32, 429
- Boron
esters, catalysts: olefin epoxidation with hydro-
peroxides, 34, 242
- Boron phosphate
catalyst, high temperature evacuation and water
adsorption effects, 34, 376
- Brass
formation, copper/zinc oxide CO-shift catalyst,
34, 209
- Bromobutanes
elimination reaction stereochemistry, 33, 474
- Brønsted and Lewis sites
acidic, butene isomerization over silica-alumina,
35, 359
- Brønsted sites
acidic: *cis*-2-butene isomerization over silica-
alumina, 34, 423
- Butadiene
adsorption on $\text{UO}_3\text{-Sb}_2\text{O}_3$, 35, 452
- Butene
adsorption on $\text{UO}_3\text{-Sb}_2\text{O}_3$, 35, 452
diffusion during isomerization, 32, 37
isomerization
on Co_3O_4 , hydrogen effect on, 32, 376
on strontium oxide, 37, 144
on $\text{TiO}_2\text{-SiO}_2$, 35, 225
over cation-exchange acidic resin, 32, 369
over silica-alumina, 35, 359
maleic anhydride synthesis over vanadyl phos-
phate catalysts, 34, 345
oxidation, multicomponent molybdate catalyst,
32, 25
- 1-Butene
isomerization
and oxidation over tin-antimony oxides, 34,
68
by strontium oxide, 32, 144
over amorphous alumina, 33, 123
- n*-Butenes
isomerization over platinum black, 34, 1
- t*-Butyl alcohol
dehydration, adsorption studies at reaction con-
ditions, 32, 396
- Butylcarbonitrile
formation, pentylamine conversion over $\text{MoO}_3\text{-}$
 Al_2O_3 , 34, 215
- C**
- Calcium oxide
basicity, benzaldehyde conversion, 35, 247
nitric oxide adsorption, 34, 479
- Carbohydrate synthesis
from formaldehyde: homogeneous catalysis, 32,
216
- Carbon
active: catalyst for H_2S oxidation, 35, 11
formation from benzene on copper-nickel alloys,
33, 98
scales, excess free energy of formation, 33, 160
- Carbon-alkali metal
catalyst: $\text{H}_2\text{-D}_2$ exchange, 35, 320
- Carbon black
burning catalyst, 35, 383

- graphitized, platinum crystallite growth, **35**, 307
olefin isomerization on, **32**, 80
- Carbon black catalyst
distribution of site activity in olefin isomerization, **32**, 80
- Carbon dioxide
adsorption forms on Co_3O_4 CO-oxidation catalyst: desorption from Co_3O_4 , **33**, 149
chemisorption, on europium oxides and Al_2O_3 at 500°C , **33**, 219
from CO oxidation over nickel oxide, **35**, 369
- Carbon monoxide
adsorption
bridge-bonded and linear, **32**, 315
in AgX and AgY zeolites, **32**, 482
on cobalt, with hydrogen, **32**, 325
on ruthenium-silica, **32**, 254
on supported palladium and palladium-silver alloys, ir spectra, **32**, 315
on thoria, **35**, 184
over Ni-Al, **35**, 417
and H_2 coadsorption on Pd(110), **35**, 363
chemisorption on alumina-supported platinum, **34**, 411
disproportionation over Ni, **33**, 160
hydrogenation over supported Ru and Ni, **35**, 54
interaction with H_2 on transition metals, **34**, 307
oxidation
by copper chromite: catalyst behavior during catalysis, **32**, 333
in dispersed Pt catalyst surface area determination, **33**, 279
 Mn^{2+} and Mn^{4+} catalytic activity in MgO solid solution, **33**, 493
on SnO_2 -CuO gels, kinetics, **34**, 445
over chromium-doped nickel oxide, **34**, 124
over Cr_2O_3 - MoO_3 , catalysis mechanisms, **34**, 203
over metal oxides, **33**, 108
to CO_2 over nickel oxide, **35**, 369
pretreatment: nickel oxide reduction by H_2 , **35**, 92
reactions with water vapor, copper/zinc oxide catalyst stability, **34**, 209
selective poisoning of Pt, **35**, 391
surface coverage and ir spectra, surface potential, adsorption heat, **33**, 57
- Carbonyl sulfide
hydrolysis, mechanism, **35**, 218
- Carbonyl sulfide-sulfur dioxide
reaction: catalyst basicity, **35**, 218
- Carbon tetrachloride
adsorption on uranium dioxide, **32**, 272
- Catalysis
hydrogen-deuterium equilibration, rate law, mechanism, **34**, 454
- Catalyst
basicity, COC-SO₂ and COS hydrolysis reactions, **35**, 218
homogeneous oxidation, **35**, 189
model: monolayer and intercalation, **35**, 297
oxidation reactions on platinum, **34**, 159
oxidation, tin-antimony oxides, spectroscopy and thermogravimetric analysis, **34**, 68
supported, Fermi energy measurement, **34**, 462
supported metal
sintering, model, **34**, 390
sintering, solution to a model, **34**, 400
surface area change, model, **34**, 390
surface area change, predictions, **34**, 400
- Catalyst density
for maximal reaction rate, **32**, 237
- Catalytic etching
of platinum in NH_3 oxidation, **32**, 114
- Catalytic site activity
distribution (carbon black), **32**, 80
- Charge transfer
redox of bismuth molybdates, ESR, **34**, 257
- Chemisorption
carbon monoxide
on metal, surface coverage effects, **33**, 57
on silica-supported nickel-copper, ir spectra, **34**, 162
on supported palladium (ir spectra), **32**, 315
complexes: CO and H_2 interaction on transition metals, **34**, 307
 CO_2 over europium oxides and Al_2O_3 at 500°C , **33**, 219
 H_2 , O_2 , CO, and NO on silica, **32**, 103
 H_2 or CO on alumina supported platinum, X-ray and electron microscopy comparison, **34**, 411
hydrogen or oxygen on platinum (silica-supported), **32**, 159
reactive silica, dual reaction center, **32**, 103
ruthenium metal surface area measurement, **34**, 57
static: supported metal catalyst aging, **35**, 115
- Chromia
 η -alumina support, toluene adsorption, neutron scattering, **35**, 472
- Chromia-alumina
solid solutions
nitrous oxide decomposition, **33**, 307
oxygen adsorption, **33**, 299
oxygen isotope equilibration, **33**, 322
- Chromium
 Cr^{3+} luminescence study of $\text{Al}_2(\text{MoO}_4)_3$ formation over $\text{MoO}_3/\gamma\text{-Al}_2\text{O}_3$, **32**, 497
nickel oxide doped with, **34**, 124
- Chromium dioxide
ortho-parahydrogen conversion on, **35**, 273

- Chromium oxide
supported, olefin polymerization, **35**, 335, 345
- cis*-2-Butene
isomerization over silica-alumina, **34**, 423
- cis*-2-Pentene
isomerization metathesis with $W(CO)_5P\phi_3$,
EtAlCl₂, O₂, **34**, 152
metathesis over $W(CO)_5P\phi_3$, EtAlCl₂, O₂ effect
on, **34**, 196
- cis-trans*
isomerization during *cis*-2-pentene metathesis
with $W(CO)_5P\phi_3$, EtAlCl₂, O₂, **34**, 152
- Claus sulfur recovery
cobalt-molybdate catalyst and, **32**, 261
- Clinoptilolite
deamination ir spectra, **32**, 442
- Coadsorption
hydrogen and carbon monoxide on Pd(110), **35**,
363
- Cobalt
hydrogen and carbon monoxide coadsorption on,
32, 325
- Cobalt bromide
alkylbenzene autoxidation in acetic acid, **33**, 480
- Cobalt-iron
 $Co_xFe_{3-x}O_4$, Co^{II} on octahedral lattice sites in
H₂O₂ decomposition, **32**, 452
- Cobalt-iron oxides
Co:Fe ratio and H₂O₂ decomposition rates, **32**,
452
- Cobalt-molybdate catalyst
basicity, **35**, 218
sulfur recovery process (Claus), **32**, 261
sintering in, **32**, 63
- Cobalt-molybdenum-alumina
hydrodesulfurization catalyst, sulfiding effect on
structure, **33**, 350
- Cobalt oxide
n-butene isomerization over Co₃O₄, hydrogen ef-
fect on, **32**, 376
- Coke formation
on HY zeolites, **33**, 17
- Coking
and decoking on Ni, alkali promoted, **33**, 184
- Co₃O₄
hydrocarbon and CO oxidation on, **33**, 108
oxidation catalyst, interaction with CO₂, **33**, 149
- Co₃O₄-Al₂O₃
hydrocarbon and CO oxidation on, **33**, 108
- Copper
formic acid heterogeneous decomposition, **34**,
156
surface poisoning by lead, Auger electron spec-
troscopy, **34**, 356
ZnO support, brass formation and catalyst sta-
bility, **34**, 209
- Copper(II)
oxidation catalyst, EPR, **35**, 196
- Copper chromite
carbon monoxide oxidation: catalyst resistance
changes during, **32**, 333
- Copper-gold
ordered alloys, surface enrichment, **33**, 202
- Copper-nickel
and carbon formation from benzene, **33**, 98
- Copper oxide
aqueous-phase phenol oxidation, **35**, 140
olefin oxidation, electron exchange processes, **34**,
462
- Cracking
n-paraffin over hydrogen ferrierite, **35**, 256
pentylamine over MoO₅-Al₂O₃, **34**, 215
- α -Cr₂O₃
single crystals, and hydrogen peroxide decom-
position, **33**, 138
- Cr(III) spinel
propylene oxidation, **35**, 427
- Crystallite
size effects; low-temperature ammonia oxidation
over supported Pt, **33**, 457
- Cumene
cracking activity, hydrogen Y zeolites, **34**, 267
cracking on HY and hydrolyzed HY zeolites,
33, 17
cracking on stabilized HY zeolites, **33**, 31
dehydrogenation over bismuth uranate and
uranium oxide, kinetics, **34**, 167
- Cupric oxides
divided, isopropyl alcohol oxidation to acetone,
34, 329
- Cyclohexanone
hydrogenation over group VIII metals, **35**, 24
- Cyclohexene
oxidation over transition metal complexes, **34**,
175
- Cyclohexene oxide
catalytic formation of, **34**, 175
- Cyclohexenyl hydroperoxide
liquid-phase decomposition in cyclohexene, over
MnO₂, **33**, 355
- Cyclopentenes
dimethyl-: isomerization on palladium films,
32, 279
- Cyclopropane
hydrogenolysis over platinum, **34**, 294

D

- Deactivation
changes with alumina content, **35**, 359
zinc oxide catalyst, during β -phenyl-ethyl alco-
hol decomposition, **33**, 327

- Dealkylation
 cumene over NH_4Y zeolites in pulse microreactor, **33, 17**
- Dealumination
 influence on butene isomerization kinetics, **34, 423**
- Dehydration
 alcohol: pulse reaction technique, **33, 365**
 binary mixture, primary-secondary alcohols over reduced nickel oxide-Cab-O-Sil, **34, 338**
 butyl alcohols over matrix-bound sulfonic acid groups, **34, 275**
 ethanol to diethyl ether over hydrogen ion exchange resin, **33, 74**
 parametric sensitivity in the simulation of γ -alumina, **32, 99**
 β -phenyl-ethyl alcohol over zinc oxide, **33, 327**
 2-propanol over alkali cation-exchanged zeolites, **33, 486**
 secondary alcohols over alumina, steric and inductive effects on selectivity, **33, 142**
- Dehydroaromatization
 oxidative, $\text{C}_7\text{-O}_4$ olefins over $\text{Bi}_2\text{O}_3\text{-SnO}_2$, **34, 29**
- Dehydrochlorination
 1,2-dichloroethane on activated carbon, **32, 466**
- Dehydromerization
 oxidative, $\text{C}_7\text{-C}_4$ olefins over $\text{Bi}_2\text{O}_3\text{-SnO}_2$, **34, 29**
- Dehydrogenation
 β -phenyl-ethyl alcohol over zinc oxide, **33, 327**
 ethylbenzene and cumene over bismuth uranate and uranium oxide, kinetics, **34, 167**
 oxidative, ethylbenzene over nickel-tungsten mixed oxides, **34, 7**
 n -pentane over $\text{Ru-Al}_2\text{O}_3$, **33, 153**
 pentylamine over $\text{MoO}_3\text{-Al}_2\text{O}_3$, **34, 215**
 piperidine over $\text{CoO-MoO}_3\text{-Al}_2\text{O}_3$, **34, 230**
 2-propanol over alkali cation-exchanged zeolites, **33, 486**
- Dehydrohalogenation
 halobutanes over alkaline earth metal oxides and alumina, **33, 474**
- Demanding reactions (Boudart)
 subclassification of, **32, 166**
- Desorption
 temperature-programmed: $\text{CO}_2\text{-Co}_3\text{O}_4$ system, **33, 149**
 vacuum flash: competitive sorption kinetic measurements, **32, 50**
- Desulfurization
 thiophene, mechanism, **34, 324**
- Deuterium
 exchange, thiophene desulfurization, **34, 324**
 isotope effect: benzaldehyde conversion, **35, 247**
- Deuterium oxide
 stepwise exchange, propene and ethylene, **34, 98**
- Deuterium-water
 exchange in gas from nuclear detonations; catalytic effect of geologic samples, **33, 402**
- Dibenzenechromium
 cations on silica gel and in Y-type zeolites, EPR, **35, 447**
- Dibenzothiophene
 hydrogenolysis over $\text{CoO-MoO}_3\text{-Al}_2\text{O}_3$, **35, 353**
- 1,2-dichloroethane
 decomposition to vinyl chloride and hydrogen chloride on activated carbon, **32, 466**
- Differential thermal analysis
 hydrodesulfurization catalysts, **32, 63**
- Diffusion
 in catalyst preparation, **35, 206**
 intraparticle, catalytic reaction and fouling effects, **32, 37**
 isobaric binary, catalyst pellets, **34, 246**
- 2,2-Dimethylbutane
 catalytic oxidation, **34, 61**
- 2,6-Dimethylpyridine
 selective reaction with Brønsted sites, **34, 267**
- Dinitrogen
 inhibition of isomerization by, **35, 73**
- Dispersed metallic catalysts
 structure and preparation, **35, 162**
- Disproportionation
 carbon monoxide over Ni, **33, 160**
 olefin, selectivity improved by olefin pretreatment of molybdena-alumina, **33, 83**
 olefins over tungsten oxide on silica, ligand influence, **34, 52**
 pentylamine over $\text{MoO}_3\text{-Al}_2\text{O}_3$, **34, 215**
 propene over supported hexacarbonyl catalysts, **34, 191**
 toluene over stabilized HY zeolites, **33, 31**
- Dusty-gas model
 bimodal catalysts, **34, 246**
- Dysprosium oxide
 parahydrogen conversion on, **34, 35**

E

- Effectiveness factors
 nonisothermal, simplified representation, **34, 317**
- Electrocatalysis
 porphyrins and phthalocyanines, **33, 133**
- Electroless plating
 initiation, minimum coverage of Pd, Ag, Au, and Cu catalysts, **32, 429**
 nickel, effect of amine borane structure on activity, **32, 429**
- Electronic interactions
 in catalytic behavior of NiO-TiO_2 system, **35, 80**
- Electronic spectra
 oxyhydrochlorination catalysts on alumina, **33, 210**

- Electron microscopy
 metal catalysts, particle size distribution studies; limitations, **33, 233**
 platinum diameter in alumina-supported catalysts, **34, 411**
 ruthenium catalysts, **34, 57**
 supported metal catalyst aging, **35, 115**
- Electron paramagnetic resonance (EPR)
 cobalt-containing zeolites (A, X, and Y) during dehydration, **33, 434**
 dibenzenechromium cations on silica gel and in Y-type zeolites, **35, 447**
 iron(III) impurities in ammonium-exchanged NaY zeolite, **33, 169**
 O₂⁻ formation and reactivity on Ag, **33, 392**
 oxidative coupling reaction of aniline, **35, 196**
 zeolites: H atom yield and catalytic activity, **34, 317**
- Electron spin resonance (ESR)
 carbon monoxide adsorption on thoria, **35, 184**
 olefin interactions with Na and K molybdates, **33, 1**
 signal, activity correlation, **35, 345**
 vanadium(IV): maleic anhydride from 1-butene, **34, 345**
 zinc oxide catalysts for ethylene hydrogenation, **35, 167**
- Electron transfer
 alumina surfaces, **32, 20**
- Epoxidation
 ethylene over silver, **34, 13**
 molybdenum complexes as catalysts, **34, 175**
 olefins with *tert*-butyl hydroperoxide over boron esters, **34, 242**
- Esterification
n-propanol-acetic acid over silica gel, mechanism, **35, 44**
- Ethane
 hydrogenolysis, mechanism, **35, 18**
- Ethanol
 dehydration acid resin catalyzed, **33, 74**
 dehydrogenation on γ -alumina: simulation, **32, 99**
- Ethers
 binary mixture alcohols over reduced nickel oxide-Cab-O-Sil, **34, 338**
- Ethylbenzene
 dehydrogenation over bismuth uranate and uranium oxide, kinetics, **34, 167**
 oxidation over nickel-tungsten mixed oxides, **34, 7**
- Ethylene
 adsorption on supported rhenium oxide, **34, 494**
 flash hydrogenation on tungsten, **32, 88**
 hydration on TiO₂-SiO₂, **35, 225**
 hydrogenation
 on tungsten crystal surface, **32, 88**
 on ZnO, ESR, **35, 167**
 over silica-alumina supported Ni, **33, 7**
 oxidation over silica- and alumina-supported silver-palladium, **32, 492**
 polymerization over supported chromium oxide, **35, 335, 345**
- Europium monoxide
ortho-*parahydrogen* conversion on, **35, 273**
- Europium oxides
 supported and unsupported, in water-gas redox shift, **33, 219**
- Exchange reactions
 catalytic: data analysis, **35, 189**
 deuterium, hydrogen adsorption by nickel films, **34, 454**
 hydrogen with deuterium oxide over metal films, **34, 98**
- F**
- Faujasite
 H type (H-Y), vinyl ether polymerization over, **34, 19**
 stabilized structures, surface properties in cumene cracking and toluene disproportionation, **33, 31**
- Ferric oxide
 reduction by hydrogen, Pt catalyst, **34, 368**
- Ferrierite
 synthesis and catalytic properties, **35, 256**
- Ferrocene
 on porous silica
 effects of irradiation, **32, 107**
 Raman spectrum of, **32, 127**
- Ferrous oxide
 burning catalyst, **35, 383**
- Flash hydrogenation
 ethylene on tungsten single crystals, **32, 88**
- Flow
 and diffusion (simultaneous) in catalyst pellets, **34, 246**
- Fluorescence
 from high-area silica, silica-alumina, and alumina oxide surfaces: reduction, **32, 343**
- Formaldehyde
 from methanol oxidation, **35, 176**
- Formic acid
 copper mobility during heterogeneous reaction, **34, 156**
- Formose condensation
 reaction mechanisms, **32, 216**
- Free radicals
 aqueous-phase phenol oxidation over copper oxide, **35, 140**

G

- Gases
 adsorption kinetics (competitive) CO and H₂
 on platinum, 32, 50
- Geologic samples
 tuff, alluvium, sandstone, and shale; deuterium-
 water exchange reaction, 33, 402
- Gold
 alumina-supported oxygen transfer, propylene-
 propylene oxide system, 32, 72
- Group VIII metals
 catalyst for ketone hydrogenation, 35, 24

H

- Halogen
 exchange reaction over alkaline earth metal ox-
 ides and alumina, 33, 474
- H₂-D₂ equilibration
 on transition metals, selective poisoning, 35, 391
- Hedvall effect
 α -Cr₂O₃ single crystals, hydrogen peroxide de-
 composition, 33, 138
- Heterogeneous catalysis
 and concomitant adsorption, 33, 74
 and homogeneous, substituted cobalt tetra-
 phenylporphyrins, 33, 68
 topochemical
 metal oxide reduction by hydrogen, Pt cat-
 alyst, 34, 368
 UF₄ oxidation and UO₂F₂ and UO₃ reduction
 over platinum, 34, 106
 UF₄ oxidation over Pt, Ru, Ir, Os, Pd, Ad, Au,
 and Co₃O₄, 34, 360
- Heterogenous-homogeneous
 catalysis in flames, 35, 383
- Hexane
 reactions over palladium-gold alloys, 35, 407
- Homogeneous catalysis
 group IB metal salts, nitrocompound hydrogena-
 tion to oximes, 33, 289
 transition metal complexes, mixtures in cyclo-
 hexene oxidation, 34, 175
- Hydrocarbon
 catalysis: methylcyclopentane hydrogenolysis,
 35, 162
 C₂H₄ and C₂H₆ oxidation over metal oxides, 33,
 108
 reactions over palladium-gold alloys, 35, 407
 steam-reformed over nickel, 33, 184
- Hydrocracking
 pentylamine over MoO₃-Al₂O₃, 34, 215
- Hydrodesulfurization
 activity of molybdenum sulfide catalyst, 34, 145
 catalyst structure, sulfiding effect on, 33, 350
- Hydrogen
 adsorption
 and exchange reaction by nickel films, 34, 454
 enhancement during H₂-O₂ titration on alu-
 mina-supported Pt, 34, 132
 on cobalt, with carbon monoxide, 32, 325
 on Pt/Re/alumina catalysts, 35, 434
 on ruthenium, 34, 57
 and butene isomerization over cobalt oxide, 32,
 376
 and CO coadsorption on Pd(110), 35, 363
 atom yield, catalytic activity on zeolites, 34, 317
 chemisorption on alumina-supported platinum,
 34, 411
 chemisorption on platinum (silica-supported),
 32, 159
 current: alcohol (binary mixture) dehydration
 over nickel on silica, 34, 338
 interaction with CO on transition metals, 34, 307
 metal oxide reduction, Pt catalyst, 34, 368
 nickel oxide reduction: pretreatment with CO
 or NH₃, 35, 92
 nitric oxide reduction by hydrocarbons over
 platinum-silica, promotion by, 32, 470
ortho-para conversion and magnetocatalytic ef-
 fects on EuO and CrO₂, 35, 273
 retention by reduced molybdena-alumina cat-
 alyst, 34, 41
 spillover from nickel-alumina to alumina, 33,
 145
- Hydrocarbons
 methane and acetylene reduction of nitric oxide
 over platinum-silica, 32, 470
 reforming, on alumina- and zeolite-supported
 Ni, 32, 434
- Hydrogenation
 acetylene over palladium-gold alloys, 35, 407
 CO over Ru and Ni, 35, 54
 competitive: cyclohexanone and methylcyclo-
 hexanone over group VIII metals, 35, 24
 ethylene
 at room temperature, hydrogen spillover ef-
 fects, 33, 145
 on ZnO, ESR, 35, 167
 over silica-alumina supported Ni, 33, 7
 methyl 4-*t*-butyl-1-cyclohexenyl ether over Pt,
 34, 490
 nitrocompounds over group IB metal salts, 33,
 289
 over noble metals, excess free surface energy,
 35, 289
 stereochemistry, temperature effect, 34, 490
- Hydrogen-deuterium
 exchange
 molecules with nonequivalent hydrogen
 atoms, 35, 189
 over active carbon-alkali metal, 35, 320

- Hydrogenolysis
benzo- and dibenzothiophene over CoO-MoO₃-Al₂O₃, **35, 353**
cyclopropane over platinum, **34, 294**
ethane, **35, 18**
methylcyclopentane over dispersed bimetallic catalysts, **35, 162**
piperidine over CoO-MoO₃-Al₂O₃, kinetics, **34, 230**
pyridine over molybdenum-containing catalysts, mechanism, **34, 215, 230**
temperature effect, **34, 490**
- Hydrogen-oxygen
reaction on lanthanide oxides, kinetics, **33, 335**
- Hydrogen peroxide
decomposition
by cobalt-iron oxides, **32, 452**
over α -Cr₂O₃, Hedvall effect, **33, 138**
over silver-gold, **32, 175**
- Hydrogen sulfide
reaction with oxygen, **35, 11**
- Hydroperoxide
olefin epoxidation with, over boron esters, **34, 242**
- Hydroxyl groups
active sites on stabilized HY zeolites, **33, 31**
in clinoptilolite, nature and catalytic activity, **32, 442**
in HY zeolite, ir spectra, **33, 158**
NaHY zeolites, amphiprotic properties in, **32, 183**
on NH₄Y zeolites, active sites in cumene cracking, **33, 17**
- I
- Impregnation
porous catalysts, concentration profiles, **35, 206**
- Infrared spectra
adsorbed benzaldehyde, **35, 247**
adsorbed propyne, **32, 148**
amino acid adsorption on Ni/SiO₂, **33, 176**
ammonia and pyridine on clinoptilolite, **32, 442**
1-butene polymerization and aromatic alkylation over type Y zeolite, **33, 256**
carbon monoxide adsorption on alumina-supported Pt with preadsorbed oxygen, **34, 132**
carbon monoxide chemisorption
on metal, **33, 57**
on silica-supported nickel-copper, **34, 162**
cobalt tetraphenylporphyrins, correlation with substituent catalytic activity, **33, 68**
CO in Ag zeolites, **32, 482**
2,6-dimethylpyridine, pyridine on Y zeolites, **34, 267**
nitric oxide sorption on calcium oxide, ir spectra, **34, 479**
OH groups in HY zeolite, **33, 158**
- Iodides
oxidation by silica-alumina catalysts, **32, 10**
- Infrared spectra
surface hydroxyls and adsorbed water, η -alumina, **35, 1**
- Infrared spectroscopy
boron phosphate: effects of heating and evacuation, and water adsorption, **34, 376**
2-propanol on metal oxide, **34, 117**
- Iodine
reduction, at alumina surfaces, **32, 20**
- Ion
clusters (hydrocarbon), from catalytic oxidation, **34, 61**
- Ion exchange
Mn²⁺, Co²⁺, and Ni²⁺ in zeolites NaX and NaY, **33, 62**
- Ion exchange resins
1-butene isomerization over acidic resin, **32, 369**
catalyst: benzene propylation, **34, 288**
supported metal catalysts from, **32, 204**
- Iridium
activity and excess free surface energy relationship, **35, 289**
- Iridium-gold
films, alkane reactions on, **35, 330**
- Iron
chemical state in reduced PdFe/Al₂O₃ catalysts, **35, 232**
extraction from zeolite; antiferromagnetism and counterions EPR, **33, 169**
propylene oxidation, **35, 427**
- Iron films
olefin exchange on, **32, 288**
olefin isomerization on, **32, 288, 294**
- Iron molybdate
olefin oxidation, electron exchange processes, **34, 462**
- Iron oxide
catalyst for H₂S oxidation, **35, 11**
- γ -Irradiation
H atoms on zeolites, **34, 317**
- Isobutane
formation: isobutyl alcohol over matrix-bound sulfonic acid groups, **34, 275**
- Isomerization
1-butene by strontium oxide, **32, 144**
butene, kinetics and mechanism, **34, 423**
n-butene on cobalt oxide, **32, 376**
1-butene on H-clinoptilolite, **32, 442**
butene, on strontium oxide, **37, 144**
butene on TiO₂-SiO₂, **35, 225**
1-butene over amorphous alumina: oxidizing-reducing sites, **33, 123**

- 1-butene, over cation-exchanged acidic resin, **32**, 369
- n*-butenes over platinum black, absence of molecular hydrogen, **34**, 1
- 1-butene over tin-antimony oxides, **34**, 68
- cis-trans* during *cis*-2-pentene metathesis with $W(CO)_5P\phi_3$, $EtAlCl_2$, O_2 , **34**, 152
- double bond
- catalyzed by Ru complexes, **35**, 73
 - inhibition by N_2 , **35**, 73
- cis-trans*, octadecenoates over nickel, **32**, 337
- olefins, catalysis mechanisms, **34**, 203
- olefins over iron and palladium films, **32**, 279, 288, 294
- n*-pentane on Ru, **33**, 153
- vinylcyclopropanes over rhodium, **33**, 91
- Isooctane
- cracking and H atom yield on zeolites, **34**, 317
- Isotope exchange
- hydrogen-deuterium adsorbed on Pt or Pt-Au alloy films, **33**, 316
- K**
- Kinetics
- catalytic oxygen transfer, **32**, 72
- L**
- Lanthanide
- metal chloride, as oxyhydrochlorination catalyst on alumina, **33**, 210
- Lanthanide oxides
- neodymium, hydrogen-oxygen reaction kinetics, **33**, 335
- Lanthanum calcium manganites
- Mn^{3+} and Mn^{4+} activity in ammonia oxidation, **32**, 415
- Lead
- surface poisoning of copper catalysts, **34**, 356
- Lewis sites
- cis*-2-butene isomerization over silica-alumina, **34**, 423
- Ligands
- olefin disproportionation over tungsten oxide on silica, influence of, **34**, 52
- Luminescence spectroscopy
- $Al_2(MoO_4)_3$ formation over $MoO_3/\gamma-Al_2O_3$, **32**, 497
- Lutetia
- parahydrogen catalyst, **33**, 284
- M**
- Magnesium oxide
- benzaldehyde conversion, **35**, 247
 - CO oxidation, Mn^{3+} and Mn^{4+} catalytic activity, **33**, 493
 - 2-propanol and acetone adsorption, **34**, 117
- Magnetic measurements
- supported metal catalyst aging, **35**, 115
- Magnetocatalytic effects
- ortho-parahydrogen* conversion on EuO and CrO_2 , **35**, 273
- Maleic anhydride
- synthesis from 1-butene over vanadyl phosphate catalysts, **34**, 345
- Manganese
- Mn^{3+} and Mn^{4+} catalytic activity in MgO solid solution, for CO oxidation, **33**, 493
- Manganese dioxide
- cyclohexenyl hydroperoxide decomposition, **33**, 355
- Mars and Van Krevelen mechanism
- isopropyl alcohol partial oxidation over copper oxides, **34**, 329
- Mass spectrometry
- 1-butene polymerization and aromatic alkylation over type Y zeolite, **33**, 256
 - hydrocarbon ions, from catalytic oxidation, **34**, 61
- Mercuric salts-active charcoal
- olefin oxidation, **33**, 448
- Metal catalysts
- crystallite size effects, **32**, 166
 - resin-supported (cation exchange), **32**, 204
- Metal films
- evaporated, of Pt, Rh, Pd, Ni, **34**, 98
- Metal oxides
- volcano relationships in catalytic reactions on, **33**, 385
- Metals
- electrocatalysis of nitric acid reduction, **32**, 230
 - supported catalyst
 - aging: electron microscopy, small angle X-ray scattering, magnetic measurements, static chemisorption, **35**, 115
 - particle size and characterization, electron microscopy, **33**, 233
 - Pt surface area determination by CO titration, **33**, 279
- Metal oxide
- automotive exhaust catalysts, SO_x poisoning, **33**, 249
- Metathesis
- cis*-2-pentene
 - isomerization with $W(CO)_5P\phi_3$, $EtAlCl_2$, O_2 , **34**, 152
 - over $W(CO)_5P\phi_3$, $EtAlCl_2$, O_2 effect on, **34**, 196
- Methanation
- over Ru and Ni, **35**, 54
- Methane
- catalytic decomposition over Ni, **33**, 160
 - preparation over supported Ru and Ni, **35**, 54
- Methanol
- oxidation on supported silver, **35**, 176

- Methyl 4-*t*-butyl-1-cyclohexenyl ether
hydrogenation over platinum, **34**, 490
- Methylcyclohexanones
hydrogenation over group VIII metals, **35**, 24
- Methylcyclopentane
hydrogenolysis over dispersed bimetallic catalysts, **35**, 162
- Methyl elaidate
hydrogenation over nickel: *cis-trans* isomerization and double-bond migration, **32**, 337
- Methyl oleate
hydrogenation over nickel: *cis-trans* isomerization and double-bond migration, **32**, 337
- 2-Methyl-1-pentene
isomerization on carbon black, inhibition by water, **32**, 80
- MgO and NiO
infrared studies of acetone adsorption on, **32**, 155
- Microcalorimetry
water adsorption, η -alumina, **35**, 1
- Mobility
copper during heterogeneous reaction, **34**, 156
- Molecular orbital calculations
LCAO-MO for chemisorbed carbon monoxide, **33**, 57
- Molecular sieve 13X
catalyst for H₂S oxidation, **35**, 11
- Molybdate
bismuth (multicomponent), cationic effects on activity of, **32**, 25
olefin oxidation and ammoxidation, **35**, 401
- Molybdena
supported: lower olefin oxidation, **35**, 278
- Molybdena-alumina
catalyst, reduction and hydrogen retention, **34**, 41
olefin disproportionation selectivity improvement by olefin pretreatment, **33**, 83
- Molybdenum
oxide, and structural changes in alumina catalyst support, **32**, 63
- Molybdenum-cobalt-alumina
hydrodesulfurization catalyst, sulfiding effect on structure, **33**, 350
- Molybdenum disulfide
 γ -alumina and silica support, promoted by cobalt, nickel and zinc, **35**, 297
- Molybdenum hexacarbonyl
oxide support, propene disproportionation, **34**, 191
- Molybdenum oxide-aluminum oxide
catalyst
pentylamine conversion, **34**, 215
piperidine conversion, **34**, 230
- Molybdenum sulfide
hydrodesulfurization activity and electronic properties, **34**, 145
- Molybdenum trioxide
 γ -alumina and silica support, promoted by cobalt, nickel and zinc, **35**, 297
- MoO₃/ γ -Al₂O₃
Al₂(MoO₄)₃ formation over, **32**, 497
- Mordenite
H type, vinyl ether polymerization over, **34**, 19
- Mössbauer effect
on ¹⁵¹Eu, oxidation-reduction of catalysts, **33**, 219
- Mössbauer spectra
Fe/Al₂O₃, PdFe/Al₂O₃, **35**, 232
- N**
- Neodymium oxide
hydrogen-oxygen reaction on, **33**, 335
parahydrogen conversion on, **34**, 35
- Neutron scattering
toluene adsorption on alumina-chromia, molecular motions, **35**, 472
- Nickel
alumina and zeolite support, reaction rate dependence on surface structure, **32**, 434
amino acid adsorption, **33**, 176
CO hydrogenation on, **35**, 54
evaporated film, hydrogen adsorption, **34**, 454
hydrocarbon coking and decoking, alkali- or magnesia-promoted, **33**, 184
silica-alumina supported, ethylene hydrogenation kinetic mechanism, **33**, 7
silica support, alcohol dehydration, **34**, 338
silica supported, octadecenoate hydrogenation: *cis-trans* isomerization and double-bond migration, **32**, 337
- Nickel-alumina
aerogel, hydrogen spillover to alumina, **33**, 145
alloys, photoelectric work functions, **35**, 417
- Nickel-copper
silica-supported, carbon monoxide chemisorption, ir spectra, **34**, 162
- Nickel oxide
chromium doped
carbon monoxide oxidation, **34**, 124
electronic properties, **34**, 124
nitrogen oxide-oxygen exchanges over, **35**, 460
oxidation of CO to CO₂, **35**, 369
2-propanol adsorption, **34**, 117
reduction by H₂: pretreatment with CO or NH₃, **35**, 92
- Nickel tetrakis(triphenyl phosphite)
olefin dimerization, **35**, 202
- Nickel-tungsten
mixed oxides, catalyst for ethylbenzene oxidative dehydrogenation, **34**, 7

- NiO-TiO₂
 system: formation of catalysts, physicochemical properties, **35, 80**
- Nitric acid
 electroreduction by metals, electrocatalysis of, **32, 230**
- Nitric oxide
 adsorption on calcium oxide, ir spectra, **34, 479**
 decomposition over metallic oxides, **34, 440**
 reduction by hydrocarbons over platinum-silica catalyst, **32, 470**
 reduction over noble metals, **33, 376; 35, 34**
- Nitriding
 tungsten, absorption of hydrogen during, **33, 47**
- Nitrogen
 activation over alkali metal-promoted ruthenium-carbon, **32, 108**
 adsorption on Ru-C-K, **35, 61**
 isotopes, exchange in molecular nitrogen, **32, 108**
 molecular: inhibition of isomerization by, **35, 73**
 oxide-oxygen exchanges over NiO, **35, 460**
- Nitrous oxide
 decomposition on chromia-alumina solid solutions, **33, 307**
 decomposition on NiO-TiO₂, kinetics, **35, 80**
 decomposition over metallic oxides, **34, 431**
- Noble metal
 catalytic hydrogenation activity and excess free surface energy, relationship, **35, 289**
 nitric oxide reduction, **33, 376**
 pretreatment, dual state behavior, **35, 34**
- Nuclear magnetic resonance (NMR)
 pseudoboehmite, **33, 265**
- Nujol
 solvent effect in ir sample preparation, **33, 158**
-
- Octadecenoates
cis-trans isomerization over nickel, **32, 337**
 double-bond migration in hydrogenation over nickel, **32, 337**
- Olefins
 adsorption on bismuth molybdates, **32, 362**
 adsorption on UO₂-Sb₂O₃, **35, 452**
 C₂-C₄, oxidative dehydromerization over Bi₂O₃-SnO₂, **34, 29**
 disproportionation
 over molybdena-alumina, **33, 83**
 over tungsten oxide on silica, influence of ligands, **34, 52**
 epoxidation with hydroperoxides over boron esters, **34, 242**
 isomerization
 catalysis mechanisms, **34, 203**
 on carbon black, **32, 80**
 over cation-exchanged acidic resin, **32, 369**
 over iron films, **32, 288, 294**
 over palladium films, **32, 279**
- oxidation
 electron transfer, **34, 462**
 over mercuric salts-active charcoal, **33, 448**
 over molybdate, tungstate and vanadate with point defects, **35, 401**
 over Na and K molybdates, ESR spectra, **33, 1**
 polymerization over supported chromium oxide, **35, 335, 345**
- Osmium-copper
 silica support, miscibility at scale of clusters, **35, 441**
- Oxidation
 alkylbenzenes over cobaltic bromide, **33, 480**
 ammonia
 etching of platinum catalyst, **32, 114**
 over lanthanum calcium manganites, **32, 415**
 butadiene over supported molybdena, **35, 278**
 butene
 over molybdate, **32, 25**
 over multicomponent molybdates, **32, 25**
 1-butene over tin-antimony oxides, **34, 68**
 carbon monoxide
 by copper chromite: catalyst behavior during catalysis, **32, 333**
 on SnO₂-CuO gels, kinetics, **34, 445**
 over chromium-doped nickel oxide, **34, 124**
 over Cr₂-MoO₃, catalysis mechanisms, **34, 203**
 catalytic
 2,2-dimethylbutane, **34, 61**
 ethylbenzene over nickel-tungsten mixed oxides, **34, 7**
 phenol over copper oxide, **35, 140**
p-xylene over tin vanadate, **32, 1**
 CO over Mn³⁺ and Mn²⁺ dispersed in MgO solid solution, **33, 493**
 CO to CO₂ over nickel oxide, effect of external electric field, **35, 369**
 cyclohexene over transition metal complexes, **34, 175**
 electrocatalytic, hydrogen on Pt, **35, 391**
 ethylene over silica- and alumina-supported silver-palladium, **32, 492**
 hydrocarbons and CO over metal oxides, kinetics, **33, 108**
 hydrogen sulfide with oxygen, **35, 11**
 iodides by silica-alumina catalysts, **32, 10**
 isopropyl alcohol to acetone over divided cupric oxides, kinetics, **34, 329**
 iodides by silica-alumina, **32, 10**
 mercuric ion reoxidation, in olefin oxidation
 over mercuric salts-active charcoal, **33, 448**
 methanol on supported silver, kinetics, **35, 176**

- olefin
 electron transfer, 34, 462
 on Bi-Mo, 32, 362
 over mercuric salts-active charcoal, 33, 448
 over molybdate, tungstate and vanadate with point defects, 35, 401
 over Na and K molybdates, 33, 1
 propylene over bismuth molybdates, kinetics, 34, 257
 2-propanol over MgO and NiO, 34, 117
 propylene
 over α -bismuth molybdate, 34, 79
 over Cr(III) and Fe(III) spinels, 35, 427
 over supported molybdena, 35, 278
 over Zeolite X, 35, 376
 over zinc oxide, intermediates in, 32, 170
 reactions on platinum catalysts, 34, 159
 uranium tetrafluoride over platinum on γ -alumina, 34, 106
 vapor phase: *p*-xylene, 32, 1
- Oxidation-reduction
 water-gas shift reaction, over europium catalysts, 33, 219
- Oxidative dehydrogenation
 butene over supported molybdena, 35, 278
- Oxides
 catalysts (31 metals), nitrous oxide decomposition, effect of O₂, 34, 431
 catalysts (40 metals), nitric oxide decomposition, effect of O₂, 34, 440
 RuO₂, Ar⁺ and O₂⁺ ion bombardment of, 35, 66
 RuO₃, in RuO₂, 35, 66
 RuO₄, X-ray photoelectron spectroscopy of, 35, 66
- Oximes
 cyclohexanone oxime, from nitrocyclohexane hydrogenation over copper(I) chloride, in ethylenediamine, 33, 289
- Oxygen
 adsorption
 and desorption, silver powder, 33, 163
 chromia-alumina solid solutions, 33, 299
 on alumina-supported platinum, 34, 132
 chemisorption on platinum (silica-supported), 32, 159
cis-2-pentene metathesis over W(CO)₅Pφ₃, EtAlCl₂, effect of, 34, 196
 double bond type lattice Mo=O
 alkaline metal, effect, 35, 278
 effect of VA group element, 35, 278
 electrochemical reduction, 33, 133
 exchanges with NO over NiO, 35, 460
 isotope equilibration over chromia-alumina solid solutions, 33, 322
 nitric oxide decomposition over metal catalysts
 effect of, 34, 440
 nitrous oxide decomposition over metallic oxide catalysts, effect of, 34, 431
 O₂⁻, formation and reactivity on Ag, kinetics, EPR, 33, 392
 reaction with hydrogen sulfide, 35, 11
 transfer (catalytic): propylene-propylene oxide system, 32, 72
- Oxyhydrochlorination catalysts
 copper(II) alkali, alkaline earth, and lanthanide metal chloride; properties and electronic spectra, 33, 210
- P**
- Palladium
 activity and excess free surface energy, relationship, 35, 289
 coadsorption of H₂ and CO, 35, 363
 films, olefin isomerization on, 32, 279
 supported, adsorbed carbon monoxide on, 32, 315
- Palladium-gold
 alloys, hydrocarbon reactions over, 35, 407
- Palladium-silver
 alloys, carbon monoxide adsorption ir spectra on, 32, 315
- Parahydrogen
 conversion
 on neodymium and dysprosium oxides, 34, 35
 over activated diamagnetic oxides (Y₂O₃, Lu₂O₃), 33, 284
- n*-Pentane
 dehydrogenation over dilute Ru, 33, 153
- 1-Pentene
 isomerization over dihydro(dinitrogen)tris-(triphenylphosphine) ruthenium, 35, 73
- Pentylamine
 cracking, hydrocracking, dehydrogenation and disproportionation over MoO₃-Al₂O₃, 34, 215
- N*-Pentylpiperidine
 formation, piperidine conversion over CoO-MoO₃-Al₂O₃, 34, 230
- Permeability
 pure gas in catalyst pellets, 34, 246
- Petroleum
 reaction engineering studies, gradientless reactor in, 32, 247
- Phase stability
 supported bimetallic catalysts, 35, 441
- Phenol
 amination on TiO₂-SiO₂, 35, 225
 oxidation over copper oxide, 35, 140
- Photoelectric work function
 silver and modified silver catalysts, 35, 100
- Phthalocyanine
 electrocatalysis, substituent effects, 33, 133

- Piperidine
conversion over $\text{CoO-MoO}_3\text{-Al}_2\text{O}_3$, **34**, 230
- Platinum
activity and excess free surface energy, relationship, **35**, 289
alumina support
area determination by H_2 or CO chemisorption and small angle X-ray scattering, **34**, 411
 $\text{H}_2\text{-O}_2\text{-CO}$ interaction with, **34**, 132
catalysts
oxidation reactions on, **34**, 159
supported on silica, Pt X-ray emission spectra of, **32**, 159
catalytic effect: $\text{UF}_4\text{-O}_2$ reaction; reaction of UO_2F_2 and UO_2 with hydrogen, **34**, 106
catalytic etching of, in NH_3 oxidation, **32**, 114
competitive adsorption kinetics on (gases), **32**, 50
crystallite growth, graphitized carbon black support, **35**, 307
etching by ammonia oxidation, **32**, 114
films, hydrogen-deuterium exchange, **33**, 316
methyl 4-*t*-butyl-1-cyclohexenyl ether hydrogenation, NMR, **34**, 490
selective poisoning by carbon monoxide, **35**, 391
silica-supported: valence band structure, **32**, 163
single crystals, cyclopropane hydrogenolysis, **34**, 294
supported, low-temperature ammonia oxidation, **33**, 457
surface area in supported catalysts, CO titration, **33**, 279
valence band structure and crystallite size effects in, **32**, 163
X-ray emission spectra (with chemisorbed H_2 or O_2), **32**, 159
- Platinum black
n-butane isomerization over, **34**, 1
- Platinum-gold alloys
films, hydrogen-deuterium exchange, **33**, 316
- Platinum-tin
ordered alloys, surface enrichment, **33**, 202
- Point defects
correlation with catalytic activity, **35**, 401
- Poisoning
 Co_3O_4 by SO_2 , in oxidation of hydrocarbons and CO, **33**, 108
metal oxide auto exhaust catalysts, by sulfur oxides, **33**, 249
platinum films, **34**, 98
selective, of Pt, **35**, 391
Y zeolites with 2,6-dimethylpyridine, **34**, 267
- Pollutants
gaseous, reaction with solids: nitric oxide sorption on calcium oxide, **34**, 479
- Polymer
matrix [poly(styrene-divinylbenzene)], catalysis in, **34**, 275
- Polymerization
1-butene over calcined ammonium type Y zeolite, **33**, 256
vinyl ethers over zeolites, **34**, 19
- Porous silica
ESR examination of ferrocene on, **32**, 127
- Porphyrins
cobalt tetraphenylporphyrins, substituent catalytic effects, **33**, 68
- Potassium-promoted ruthenium catalyst, **32**, 108
nitrogen adsorption on, **35**, 61
- Potential
metal/semiconductor film contact, **35**, 100
- 2-Propanol
dehydration and dehydrogenation over alkali cation-exchanged zeolites, **33**, 486
oxidation over MgO and NiO, **34**, 117
- n*-Propanol
esterification with acetic acid over silica gel, **35**, 44
- Propene
disproportionation over supported molybdenum hexacarbonyl catalysts, **34**, 191
- Propylation
benzene, sulfonic acid resin catalyst, **34**, 288
- Propylene
amoxidation
over bismuth molybdates, **34**, 50
over molybdate, tungstate and vanadate with point defects, **35**, 401
and propylene oxide: catalyzed oxygen transfer between, **32**, 72
catalytic
dimerization, **35**, 202
oxygen transfer with propylene oxide, **32**, 72
oxidation
over zinc oxide, **32**, 170
over α -bismuth molybdate, **34**, 79
over Cr(III) and Fe(III) spinels, **35**, 427
over Zeolite X, **35**, 376
over zinc oxide: intermediates, **32**, 170
- Propyne
adsorbed, infrared spectra of, **32**, 148
- Proton mobility
in zeolites, **32**, 137
NMR examination in zeolites, **32**, 137
- Pseudoboehmite
boehmite plus excess water structure, **33**, 265
- Pt/Re/alumina
catalysts, state of rhenium in, **35**, 434
- Pulse reaction technique
kinetics, with irreversible adsorption, **33**, 365

- Pyrrolidine
production from tetrahydrofuran and ammonia,
35, 325
- Q**
- Quadrupole mass filter
deuterium-water exchange reaction over geo-
logic samples, 33, 402
- R**
- Raman spectra
adsorbed molecules (pyridine, benzene, methyl
iodide), 32, 343
- Reaction rate
constant reactant pressure, in ammonia decom-
position over tungsten, 33, 47
dependence on surface structure, alumina- and
zeolite-supported Ni, 32, 434
optimal catalyst density for, 32, 237
- Reactor
batch, concomitant adsorption and heterogene-
ous catalysis, 33, 74
fixed bed
fouling effect in complex reaction, 32, 384
reaction and decay parameters in optimal feed
policy, 32, 384
gradientless, in petroleum engineering, 32, 247
- Reduction
iodine over alumina, 32, 20
metal oxides by hydrogen, Pt catalyst, 34, 368
molybdena-alumina catalyst, hydrogen reten-
tion, 34, 41
nickel oxide by H₂: pretreatment with CO or
NH₃, 35, 92
nitric acid by metals, electrocatalysis of, 32, 230
nitric oxide
hydrocarbons over platinum-silica, promoted
by hydrogen, 32, 470
over noble metals, 33, 376; 35, 34
nitrocompounds to oximes, by group IB metal
salts, 33, 289
UO₂F₂ and UO₃ over platinum on γ -alumina, 34,
106
- Reforming
methane and propane with D₂O above 573 K,
34, 98
- Resins
cation exchange, supported metal catalysts from,
32, 204
- Resistance, electrical
changes during catalysis (CO oxidation by cop-
per chromite), 32, 333
- Rhenium
state in Pt/Re/alumina catalysts, 35, 434
- Rhenium oxides
alumina or silica support: ethylene adsorption,
34, 494
in Pt/Re/alumina catalysts, 35, 434
- Rhodium
homogeneous, and vinylcyclopropane isomeriza-
tion, 33, 91
- Ring transformation
tetrahydrofuran into pyrrolidine, 35, 325
- Ru- γ -Al₂O₃
n-pentane dehydrogenation, concentration effect
on product selectivity, 33, 153
- Ruthenium
activity and excess free surface energy, relation-
ship, 35, 289
CO hydrogenation on, 35, 54
dinitrogen complexes: isomerization catalysts,
35, 73
hydrogen adsorption, 34, 57
pretreatment, dual state behavior, 35, 34
surface area measurement, 34, 57
- Ruthenium-carbon catalyst
metal-promoted, and nitrogen activation, 32,
108
promoted by potassium, 32, 108
- Ruthenium-carbon-potassium
nitrogen adsorption on, 35, 61
- Ruthenium-copper
silica support, miscibility at scale of clusters, 35,
441
- Ruthenium-oxygen
systems: surface chemistry, X-ray photoelectron
spectroscopy, 35, 66
- Ruthenium-silica catalysts
carbon monoxide adsorption, EPR, 32, 254
- S**
- Sabatier-Balandin
interpretations, heterogenous catalysis, 33, 385
- Scheelite structures
catalytic activity, 35, 401
- Silica
activated gel, tetrachloroethane conversion to
hexachloroethane, 32, 384
amino acid adsorption, 33, 176
fluorescence with high-area samples, reduction,
32, 343
gas adsorption on reaction centers, 32, 103
nickel-copper support, CO adsorption, 34, 162
platinum catalysts supported on, surface com-
pound, Pt-O, Pt-H, 32, 159
porous, ferrocene on: ESR spectra, 32, 107
reactive, reaction center (dual): chemisorption,
32, 103
tungsten oxide support, olefin disproportiona-
tion, 34, 52

- Silica-alumina
 catalysts
 butene isomerization, 34, 423
 dealuminated, 35, 359
 iodide oxidation, 32, 10
 fluorescence with high-area samples, reduction, 32, 343
 iodide oxidation over, 32, 10
- Silica gel
 dibenzenechromium cations on, EPR, 35, 447
 esterification catalyst
 effect of H₂O on, 35, 44
 effect of N₂ on, 35, 44
n-propanol-acetic acid esterification, 35, 44
- Silver
 alumina-supported: oxygen transfer, propylene-propylene oxide system, 32, 72
 ethylene oxidation over, 35, 100
 exchange for sodium in zeolite Linde A, 35, 317
 modified with alkaline earth compounds, 35, 100
 O₂⁻ formation and reactivity, EPR, 33, 392
 oxygen adsorption and desorption, 33, 163
 reference electrode: Ag/AgCl/HCl, 35, 289
 supported: methanol oxidation, 35, 176
- Silver-gold
 alloys: hydrogen peroxide decomposition over, 32, 175
 disordered monophasic binary alloys, surface enrichment, 34, 13
- Silver-palladium
 ordered alloys, surface enrichment, 33, 202
 silica- and alumina-supported, ethylene oxidation, 32, 492
- Sintering
 supported metal catalysts, model, 34, 390
- Site density
 pulse reaction technique, 33, 365
 silica gel esterification catalyst, 35, 44
- Site selectivity
 Ag⁺ ion in zeolite Linde A, 35, 317
- Small angle X-ray scattering
 supported metal catalyst aging, 35, 115
- SO₂
 metal oxide auto exhaust catalyst poisoning, 33, 249
- Solid solutions
 chromia-alumina
 nitrous oxide decomposition, 33, 307
 oxygen adsorption, 33, 299
 oxygen isotope equilibration, 33, 322
- Sorption
 nitric oxide on calcium oxide, 34, 479
- Spectroscopy
 reflectance, cobalt-containing zeolites (A, X, and Y) during dehydration, 33, 434
- Spillover
 hydrogen, kinetics and mechanism, 32, 304
- Steam reforming
 hydrocarbons over Ni, 33, 184
- Stereoselectivity
anti or *syn* mode elimination reactions of halo-butanes, 33, 474
- Steric hindrance
 to adsorption of ketones, 35, 24
- Strontium oxide
 benzaldehyde conversion, 35, 247
 butene isomerization on, 32, 144
 isomerization of 1-butene by, 32, 144
- Structure sensitivity, catalytic
 primary and secondary, 32, 166
- Styrene
 production, 34, 7
- Substituent effects
 catalyzed hydrogenation of ketones, 35, 24
- Sulfiding
 cobalt-molybdenum-alumina hydrodesulfurization catalyst, effect on structure, 33, 350
- Sulfonic acid
 matrix-bound groups, catalysts, ir spectra, 34, 275
 resin, catalyst: benzene propylation, 34, 288
- Sulfur
 catalyst for hydrogen sulfide oxidation, 35, 11
 trapping in micropores during H₂S oxidation, 35, 11
- Sulfur recovery reaction (Claus)
 cobalt-molybdate catalyst and, 32, 261
- Surface area
 dispersed Pt in supported catalysts, CO titration determination, 33, 279
 ruthenium metal, chemisorption measurement, 34, 57
- Surface complexes
 carbon monoxide chemisorption on silica-supported nickel-copper, 34, 162
- Surface poisoning
 copper by lead, 34, 356
- Surface reaction
 CO oxidation determination of Pt surface area on supported catalysts, 33, 279
 propylene ammoxidation over bismuth molybdates, 34, 50
 rate constant, from pulse technique, 33, 365
- T
- Temperature
 effects: cyclohexenyl hydroperoxide decomposition over MnO₂, 33, 355
 elevated: evacuation effect on boron phosphate, 34, 376
 gradients in ethylene hydrogenation over supported Ni, conditions, 33, 7

- outgassing, effects on catalytic activity, 34, 35
- Temperature-programmed catalysis
analysis of data from exchange reactions, 35, 189
- Tetrachloroethane
conversion to hexachloroethane on activated silica gel, 32, 384
- Tetrahydrofuran
ring transformation into pyrrolidine, 35, 325
- Tetramethylammonium offretite
crystallization from alumina-silica gel, 33, 414
- Tetraphenylporphyrin
electrocatalysis, substituent effects, 33, 133
- Thermal desorption
oxygen from silver, 33, 163
- Thermal flash desorption
CO, H₂, O₂, and CH₃OH on Pt, 32, 50
- Thiophene
desulfurization mechanism, 34, 324
hydrodesulfurization
sulfide catalysts, promotion effect: cobalt, nickel and zinc, 35, 297
- Tin-antimony oxides
1-butene oxidation and isomerization, sites, 34, 68
- Tin(IV)-copper(II)
oxide gels, structure; CO oxidation, 34, 445
- Titanium dioxide-silica
acidic property, 35, 225
- Toluene
adsorption on η -alumina-chromia, neutron scattering, 35, 472
disproportionation on stabilized HY zeolites, 33, 31
- Transition metal
acetylacetonates: cyclohexene oxidation, mixed catalysts, 34, 175
chemisorption complexes (CO-H₂), 34, 307
ions Mn²⁺, Co²⁺, and Ni²⁺, exchange in zeolites NaX and NaY, 33, 62
phosphine complexes: cyclohexene oxidation, mixed catalysts, 34, 175
- Trichloroethylene
adsorption on uranium dioxide, 35, 153
- Tritium-water
exchange in gas from nuclear detonations; catalytic effect of geologic samples, 33, 402
- Tungstate
olefin oxidation and ammoxidation, 35, 401
- Tungsten
ammonia decomposition on, 33, 47
catalyst
single crystals, geometric factor in ethylene hydrogenation, 32, 88
W(CO)₅Pφ₃, EtAlCl₂ system *cis*-2-pentene metathesis, O₂ effect on, 34, 196
crystal surface: ethylene hydrogenation on, 32, 88
nitriding, absorption of hydrogen during, 33, 47
- Tungsten disulfide
 γ -alumina and silica support, promoted by cobalt, nickel and zinc, 35, 297
- Tungsten oxide on silica
olefin disproportionation, influence of ligands, 34, 52
- ## U
- Uranium dioxide
carbon tetrachloride adsorption on, 32, 272
trichloroethylene adsorption, 35, 153
- Uranium hexafluoride
preparation from UF₄, catalysts for, 34, 360
preparation, from UF₄ oxidation, 34, 106
- Uranium oxide
ethylene and cumene dehydrogenation over, 34, 167
UO₂-Sb₂O₃ catalyst, ammonia and butene adsorption over, 35, 452
- Uranium tetrafluoride
oxidation over platinum, 34, 106
platinum metal catalysis of oxidation, 34, 360
- Uranium trioxide
reduction by hydrogen, Pt catalyst, 34, 368
- ## V
- Valence band structure
dispersed platinum on SiO₂, 32, 163
- Vanadate
olefin oxidation and ammoxidation, 35, 401
- Vanadium oxide
alumina-supported: oxygen transfer, propylene-propylene oxide system, 32, 72
olefin oxidation, electron exchange processes, 34, 462
- Vanadium pentoxide
reduction by hydrogen, Pt catalyst, 34, 368
- Vanadyl phosphate
catalysts: maleic anhydride synthesis from 1-butene, structure and activity, ESR, 34, 345
- Vapor phase oxidation
p-xylene over tin vanadate, 32, 1
- Vinyl chloride
from 1,2-dichloroethane on activated carbon, 32, 466
- Vinylcyclopropanes
isomerization over homogeneous rhodium, 33, 91
- Vinyl ethers
polymerization over zeolites, 34, 19
- Volcano relationships
catalytic reactions on oxides, 33, 385
- ## W
- Water
adsorption on boron phosphate, 34, 376

Water-gas shift reaction
support interactions, Eu^{2+} on Al_2O_3 , 33, 219

Work function

changes: activity and selectivity: silver and silver modified catalysts, 35, 100
photoelectric, of Ni-Al alloys, 35, 417

X

X- $\text{AlF}_3/\text{Al}_2\text{O}_3$ ($X = \alpha, \beta$)

in 1-pentene double-bond isomerization, 33, 39

X-Ray

diffraction: pseudoboehmite spectra, 33, 265
emission spectra of platinum catalysts supported on silica, 32, 159
photoelectron spectroscopy: ruthenium-oxygen surfaces, 35, 66
small angle granulometry: platinum area determination, 34, 411

p-Xylene

vapor-phase oxidation over tin vanadate, 32, 1

Y

Ytterbia

parahydrogen catalyst, 33, 284

Yttria

parahydrogen catalyst, 33, 284

Z

Zeolite

active sites and aluminum site reactivity, 34, 327
AgX and AgY, adsorption of carbon monoxide, 32, 482
alkali cation-exchanged, acidic and basic sites in 2-propanol decomposition, 33, 486
ammonium Y, deamination, 35, 476
calcined ammonium Y type, 1-butene polymerization and aromatic alkylation, 33, 256
cobalt-containing (A, X, and Y); EPR and re-

flectance spectroscopy during dehydration, 33, 434

ferrierite, 35, 256

fluorescence with high-area samples, reduction, 32, 343

HY, ir spectra of OH groups, 33, 158

Linde A, ion exchange scheme, 35, 317

mordenite and faujasite, supports for Ni, 32, 434

NaH-Y and dealuminated: H atom yield and catalytic activity, 34, 317

NaHY: hydroxyl amphiprotic properties in, 32, 183

NaY, ammonium-exchanged, extraction of iron(III) impurities, 33, 169

NH₄Y, hydrogen and hydrolyzed forms; active sites, 33, 17

NiY, acetylene cyclotrimerization over, 32, 190

NMR examination of proton mobility in, 32, 137

offretite, crystallization chemistry, 33, 414

proton mobility in, 32, 137

ring transformation of tetrahydrofuran, 35, 325

transition metal ion exchange in types NaX and NaY, 33, 62

X type, propylene oxidation on, 35, 376

Y type

acid strength and aluminum site reactivity, 33, 497

dibenzenechromium cations on, 35, 447
selective poisoning with 2,6-dimethylpyridine, 34, 267

vinyl ether polymerization over, 34, 19

Zinc oxide

deactivation, during β -phenyl-ethyl alcohol decomposition, 33, 327

ir and ESR studies on propylene oxidation over, 32, 170

propylene oxidation over, 32, 170

silica or alumina support: activity, ESR, 35, 167